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B21J 15/02

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(54) Method and apparatus for forming rivet joints

(57) A method and apparatus (20, 90) for forming rivet joints that allow pivotal motion of the parts interconnected by such joints with a desired amount of clearance (86). Parts (66, 68) to be riveted together are aligned with each other and held in place on a parts support anvil (24, 96), and a rivet (74) is placed into aligned holes (70, 72). A rivet support anvil (38) is positioned against the

head (76) of the rivet to establish an initial condition. The rivet support anvil is adjusted a required amount with respect to the parts support anvil prior to formation of the second head (84) on the opposite end of the rivet. The rivet is allowed to move a controlled amount prior to formation of the second head, to provide the desired amount of clearance.

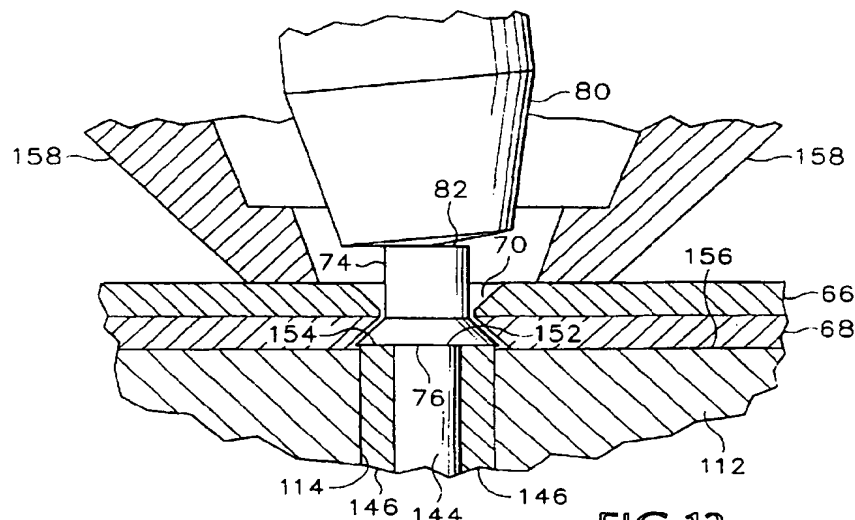


FIG.13

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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 5573

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| X | EP 0 344 906 A (GEN ELECTRO MECH CORP) 6 December 1989 (1989-12-06) | 25-28 | 821J15/10 |
| A | * column 3, line 46 - column 4, line 17; figures 1-10 * | 1, 14, 15, 19 | 821J15/12 821J15/02 |
| X | EP 0 330 341 A (TEXTRON INC) 30 August 1989 (1989-08-30) | 25-28 | |
| A | * column 7, line 22 - line 48; figures 1-6 * | 1, 14, 15, 19 | |
| | | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| | | | 821J |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 30 May 2000 | Examiner Marc Augé |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document</p> | | | |

EPO FORM 1503 (3.12.92) (Preliminary)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 30 5573

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

30-05-2000

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| EP 0344906 A | 06-12-1989 | US 4908928 A FR 2632230 A | 20-03-1990 06-12-1989 |
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EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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A DOCPHOENIX

APPL PARTS

| |
|-----------------------|
| IMIS |
| Internal Misc. Paper |
| LET |
| Misc. Incoming Letter |

371P
PCT Papers in a 371 Application

A...
Amendment Including Elections

ABST
Abstract

ADS
Application Data Sheet

AF/D
Affidavit or Exhibit Received

APPENDIX
Appendix

ARTIFACT
Artifact

BIB
Bib Data Sheet

CLM
Claim

COMPUTER
Computer Program Listing

CRFL
All CRF Papers for Backfile

DIST
Terminal Disclaimer Filed

DRW
Drawings

FOR
Foreign Reference

FRPR
Foreign Priority Papers

IDS
IDS Including 1449

NPL
Non-Patent Literature

OATH
Oath or Declaration

PET.
Petition

RETMAIL
Mail Returned by USPS

SEQLIST
Sequence Listing

SPEC
Specification

SPEC NO
Specification Not in English

TRNA
Transmittal New Application

CTNF
Count Non-Final

CTRS
Count Restriction

EXIN
Examiner Interview

M903
DO/EO Acceptance

M905
DO/EO Missing Requirement

NFDR
Formal Drawing Required

NOA
Notice of Allowance

PETDEC
Petition Decision

OUTGOING

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|---------------------|
| CTMS |
| Misc. Office Action |

1449
Signed 1449

892
892

ABN
Abandonment

APDEC
Board of Appeals Decision

APEA
Examiner Answer

CTAV
Count Advisory Action

CTEQ
Count Ex parte Quayle

CTFR
Count Final Rejection

INCOMING

AP.B
Appeal Brief

C.AD
Change of Address

N/AP
Notice of Appeal

PA..
Change in Power of Attorney

REM
Applicant Remarks in Amendment

XT/
Extension of Time filed separate

Internal

SRNT
Examiner Search Notes

CLMPTO
PTO Prepared Complete Claim Set

ECBOX
Evidence Copy Box Identification

WCLM
Claim Worksheet

WFEE
Fee Worksheet

File Wrapper

FWCLM
File Wrapper Claim

IIFW
File Wrapper Issue Information

SRFW
File Wrapper Search Info

